

APPENDIX B: CLEAN COPY OF PENDING CLAIMS (UNOFFICIAL)

1. A device comprising a composition comprising one or more autotrophic hydrogenotrophic bacteria in culture medium comprising zero-valent iron.
2. The device in accordance with claim 1, wherein said hydrogenotrophic bacteria comprise one or more species of bacteria selected from the group consisting of *Acetobacterium* spp., *Achromobacter* spp., *Aeromonas* spp., *Acinetobacter* spp., *Aureobacterium* spp., *Bacillus* spp., *Comamonas* spp., *Dehalobacter* spp., *Dehalospirillum* spp., *Dehalococcoide* spp., *Desulfurosarcina* spp., *Desulfomonile* spp., *Desulfobacterium* spp., *Enterobacter* spp., *Hydrogenobacter* spp., *Methanosarcina* spp., *Pseudomonas* spp., *Shewanella* spp., *Methanosarcina* spp., *Micrococcus* spp., and *Paracoccus* spp.
3. The device of claim 2, wherein said hydrogenotrophic bacteria comprise one or more strains of bacteria selected from the group consisting of *Acetobacterium woodi*, *Aeromonas hydrophila*, *Aeromonas sobria*, *Alcaligenes eutrophus*, *Comamonas acidovorans*, *Dehalococcoide restrictus*, *Dehalococcoide multivorans*, *Dehalococcoide ethenogene*, *Desulfobacterium tiedje*, *Enterobacter agglomerans*, *Hydrogenobacter thermophilus*, *Methanosarcina barkeri*, *Methanosarcina mazei*, *Methanosarcina thermophila*, *Paracoccus denitrificans*, *Pseudomonas aureofaciens*, *Pseudomonas maltophilia*, *Pseudomonas mendocina*, and *Shewanella putrefaciens*.
4. The device of claim 3, wherein said hydrogenotrophic bacteria comprise *Paracoccus denitrificans* ATCC17741, *Paracoccus denitrificans* ATCC35512, *Paracoccus denitrificans* ATCC13543, or *Paracoccus denitrificans* ATCC19367.
5. The device of claim 1, wherein said zero-valent iron comprises Fe(0) metal, an Fe(0) alloy, or an Fe(0)-Ni(0), Fe(0)-Zn(0), Fe(0)-Pt(0), or Fe(0)-Pd(0) bimetal.
6. The device of claim 5, wherein said zero-valent iron comprises filings, shavings, turnings, wool, powder, mesh, beads, rods, pellets, or flakes.
7. The device of claim 1, further comprising a support.

8. The device of claim 7, further comprising a glass, concrete, metallic, zeolite, mineral, fiber, fiberglass, ceramic, plastic, polymeric, or resin support.
9. A device comprising a composition comprising one or more autotrophic hydrogenotrophic bacteria in culture medium comprising zero-valent iron, said device being comprised within an environmental site.
10. The device of claim 9, comprised within a landfill site, an agricultural site, an agricultural runoff site, or an irrigation site.
11. The device of claim 9, further defined as an *in situ* reactive barrier.
12. The device in accordance with claim 11, further defined as a permeable barrier, a semipermeable barrier, a treatment wall, and injected treatment zone, or a funnel and gate system.
13. The device of claim 1, further defined as an *ex situ* bioreactor.
14. The device in accordance with claim 13, comprising an inlet port, an outlet port and a container means for containing said composition.
15. The device of claim 14, further defined as a continuous culture system, a flow-through packed column, an inline water filter, a biofermenter, a fluidized bed, a sequencing batch reactor, or an anaerobic digester.
16. The device of claim 15, comprised within a water-, wastewater- or sewage-treatment system.
17. The device in accordance with claim 16, comprised within a water treatment system, a sewage or wastewater treatment system, a municipal water supply system, or a pollution decontamination system.
18. The device of claim 1, comprised within a system for remediating pollution in an aqueous solution or an environmental site.

34. A method of removing or reducing the concentration of an organic or inorganic compound in an environmental site, comprising providing to said site an effective amount of a composition comprising one or more hydrogenotrophic bacteria and zero-valent iron, or contacting said site with a device comprising a composition comprising culture medium comprising one or more hydrogenotrophic bacteria and zero-valent iron.
35. A method for denitrifying groundwater or an environmental site *in situ* comprising contacting said groundwater or said environmental site with a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria, or contacting said site with a device comprising a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria.
36. A method for removing or reducing the concentration of a nitrogen- or sulfur-containing compound in a sample, comprising contacting a sample suspected of containing said compound with a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria, or contacting said site with a device comprising a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria.
37. The method in accordance with claim 36, wherein said sulfur-containing compound is sulfate or sulfite.
42. A method for removing or reducing the concentration of a halocarbon compound in a sample, comprising contacting a sample suspected of containing said halocarbon with a composition comprising one or more autotrophic hydrogenotrophic bacteria and zero-valent iron, or contacting said site with a device comprising a composition comprising culture medium comprising one or more autotrophic hydrogenotrophic bacteria.
43. The method in accordance with claim 42, wherein said halocarbon is carbon tetrachloride, dichloromethane, a polychlorinated biphenyl, a chlorinated benzene, trichloroethylene, perchloroethylene, dichloroethylene, vinyl chloride, chloroethane, bromoform, dichlorodifluoromethane, trihalomethanes, tetrachlorodibenzodioxin pentachlorophenol, a chlorobenzoate, atrazine, or 1,1,1-TCA.

44. The method of claim 43, wherein said halocarbon is carbon tetrachloride, dichloromethane, trichloroethylene, perchloroethylene, dichloroethylene, vinyl chloride, chloroethane, dichlorodifluoromethane, trihalomethanes, tetrachlorodibenzodioxin pentachlorophenol, a chlorobenzoate, atrazine, or 1,1,1-TCA.
45. The method of claim 44, wherein said halocarbon is carbon tetrachloride, trichloroethylene, or dichloromethane.
46. A method for removing or reducing the concentration of a haloaromatic compound in a sample, comprising contacting a sample suspected of containing said haloaromatic compound with a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria, or contacting said sample with a device comprising a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria.
47. The method in accordance with claim 46, wherein said haloaromatic compound is a polychlorinated biphenyl, a chlorinated benzene, tetrachlorodibenzodioxin pentachlorophenol, a chlorobenzoate, atrazine, or 1,1,1-TCA.
48. A method for degrading or detoxifying a pesticide, comprising contacting a sample suspected of containing said pesticide with a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria, or contacting said sample with a device comprising a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria.
49. The method in accordance with claim 48, wherein said pesticide is methoxychlor, alachlor, metolachlor, lindane, DDT, DDE, DDD, dieldrin, aldrin, heptachlor, chlordane, 2,4-dichlorophenoxyacetic acid, 2,4,5-trichlorophenoxyacetic acid or atrazine.
50. The method of claim 49, wherein said pesticide is atrazine.
51. A method for detoxifying a metal ion-containing compound, comprising contacting a sample suspected of containing said compound with a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria, or contacting said

sample with a device comprising a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria.

52. The method in accordance with claim 51, wherein said compound comprises strontium (II), cesium (I), chromium (VI) uranium (VI), technetium (VII), silver (I), or mercury (II).
53. The method of claim 52, wherein said compound comprises chromium (VI) or uranium (VI).
54. A method for reducing the concentration of nitrite-, nitrate-, sulfite-, or sulfate-containing compound in an aqueous solution or environmental site, comprising (a) selecting an aqueous solution or an environmental site containing said compound; and (b) contacting said solution or site with a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria, or contacting said solution or site with a device comprising a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria.
56. A method for reducing the concentration of a pesticide or organic pollutant in an aqueous solution or environmental site, comprising (a) selecting an aqueous solution or an environmental site containing said pesticide or pollutant; and (b) contacting said solution or site with a composition comprising zero-valent iron and a culture of one or more autotrophic hydrogenotrophic bacteria, or contacting said solution or site with a device comprising a composition comprising zero-valent iron and a culture of one or more autotrophic hydrogenotrophic bacteria.
57. A method for reducing the concentration of a mercury-, silver-, technetium-, strontium-, cesium-, chromium- or uranium-containing pollutant in an aqueous solution or environmental site, comprising (a) selecting an aqueous solution or an environmental site containing said pollutant; and (b) contacting said solution or site with a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria, or contacting said solution or site with a device comprising a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria.

58. A method for reducing silver (I), mercury (II), technetium (VII), strontium (II), cesium (I), chromium (VI) or uranium (VI) ions in an aqueous solution, comprising contacting an aqueous solution suspected of containing one or more of said ions with a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria, or contacting said aqueous solution with a device comprising a composition comprising zero-valent iron and a culture of one or more hydrogenotrophic bacteria.
59. A method for removing or reducing the concentration of a nitroaromatic compound in a sample comprising contacting a sample suspected of containing said nitroaromatic compound with one or more hydrogenotrophic bacteria and zero-valent iron, or a device comprising culture medium comprising zero-valent iron.
60. The method in accordance with claim 59, wherein said nitroaromatic compound is trinitrotoluene, RDX, HMX, 2-aminodinitrotoluene, 4-aminodinitrotoluene, or parathion.
61. The method in accordance with claim 59, wherein said nitroaromatic compound is trinitrotoluene, RDX, or HMX.